



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

## ARTICLE IX.

### CONTRIBUTIONS TO A REVISION OF THE NORTH AMERICAN BEAVERS, OTTERS AND FISHERS.

(Plates XXI-XXV.)

BY SAMUEL N. RHOADS.

Read before the American Philosophical Society, May 6, 1898.

---

An unusually fine series of the skins and skulls, with reliable data and measurements, of the beavers, otters and fishers of the United States and Canada having lately come into the custody of the writer, it is thought advisable to publish the results of a study of the various nominal forms of these mammals and briefly discuss the nomenclature involved. Owing to a lack of specimens from some regions whose faunal conditions are known to produce in many other mammals well-recognized geographic variations, this paper must be considered rather as a contribution to the subject, and in no sense a complete synopsis. The area covered by this study comprises solely that part of North America north of Mexico, no attempt being made to discuss the relationships of the tropical species.

To Mr. Outram Bangs the author acknowledges his gratitude for a most valuable loan of skins and skulls of nearly every species and race recorded in these pages. To the kindness of Mr. F. W. True, of the National Museum, is due the loan of a series of skulls of the Alaskan otter.

The North Carolina Department of Agriculture has courteously loaned two skins and four skulls of beavers recently killed in Stokes county of that State through the kind offices of Mr. H. H. Brimley, the Curator of the State Museum.

Aid has likewise been generously given by Dr. J. A. Allen, Dr. C. Hart Merriam, Dr. T. S. Palmer, Mr. Gerrit S. Miller, Jr., Dr. M. W. Raub and Mr. C. S. Brimley.

#### THE BEAVERS OF NORTH AMERICA.

Contrary to evidence which must eventually be accepted by all zoölogists, the American beaver, *Castor canadensis* Kuhl, is still considered by many eminent authorities as

specifically the same as the *Castor fiber* Linnæus of Europe. In 1897, Dr. E. A. Mearns described\* a subspecies of the typical Canadian animal, naming it *Castor canadensis frondator* and assigning its habitat to the "southern interior area of North America, ranging north from Mexico to Wyoming and Montana." This appears to be the first attempt in literature to formally subdivide the American beaver, a species whose constancy of characters over the vast and varied habitat which it frequents had hitherto been unquestioned. There can be no doubt as to the tenability of Dr. Mearns' "Broad-tailed Beaver" as distinguished from the Hudson bay animal, whose habitat Kuhl designated as "*ad fretum Hudsoni*" in his original description of *canadensis*.

It is probable that the beavers inhabiting the Carolinas, Georgia, Alabama, Mississippi and Tennessee are equally entitled to subspecific rank. So rare has the beaver become in these States, however, it would probably be impossible to verify such a prediction with specimens now in our museums.†

From what we know of the relationships of the representatives of our eastern species inhabiting the Pacific slope, we are led to expect that the beaver of that region would also prove separable from *canadensis*. A very complete series of skulls, with three adult and three young skins from the Cascades of Washington and Oregon, shows this to be the case.

Fortunately the synonymy of the American beaver is not involved and requires no elucidation in this connection, as is shown by reference to Dr. J. A. Allen's *Monograph of the North American Rodentia*. A synopsis of the American forms is herewith presented.

CANADIAN BEAVER. *Castor canadensis* Kuhl.

Plate XXI; Fig. 3. Plate XXII; Fig. 3.

*Castor canadensis* Kuhl, *Beitr. Zool.*, 1820, p. 64.

? " *Castor americanus* F. Cuvier, *Hist. des Mam. du Mus.*, 1825" (*fide* Brandt in *Kennt. Säugt. Russl.*, 1855, p. 64).

*Castor fiber americanus* Richardson, *Faun. Bor. Amer.*, I, 1829, p. 105.

*Castor fiber var. canadensis* J. A. Allen, *Monog. N. Amer. Rod.*, 1877, p. 444.

*Type Locality*.—Hudson bay ("*ad fretum Hudsoni*" Kuhl).

*Geographic Distribution*.—Northeastern North America, from the northern limit of trees south to the United States and west to the Cascade mountains; intergrading east of the Mississippi river into subspecies *carolinensis*, south-centrally into subspecies *frondator* and westwardly into subspecies *pacificus*.

\* *Proc. Nat. Mus.*, Vol. XX (adv. sheet, March 5, 1897).

† As will be seen later, such specimens have since come to hand and are described as *Castor canadensis carolinensis*.

*Color.*\*—Winter pelage, above, including sides, dark bay or blackish brown, tipped with chestnut or russet, becoming pure chestnut on top and sides of head and on chin, jaws and sides of neck. Rump and thighs purer chestnut. Ears black. Hair of feet, legs and under parts seal brown.

*Anatomical Characters.*—Size, smallest of the American forms. Scaly portion of tail more than twice as long as wide; hind foot with claw about 175 mm. Skull wide for its length; maximum size of skull 136 by 99 mm. in a New Brunswick example, No. 31, collection of E. A. and O. Bangs. Rostrum and nasals relatively short and wide, the nasal bones averaging more than half as wide as long and extending but little behind the premaxillaries. Upper molar dentition wide and heavy, the crowns oblique, triangular and very wide anteriorly.

*Measurements.*—Of a large, typical, adult male specimen from Quebec, No. 3825, collection of E. A. and O. Bangs (measurements made by collector from newly killed specimen). Total length, 1130 mm.; tail vertebræ, 410 mm.; scaly portion of tail (dry meas. from skin), 263 by 122 mm.; hind foot, 176 mm.; length of skull, 132 mm.; breadth of skull, 93 mm.; length of nasal bones, 46 mm.; breadth of nasals, 21.4 mm.†

*Remarks.*—The above diagnosis is taken mainly from the Quebec specimen, because of the authentic measurements and superior condition of the skin and pelt. The average beaver from the Hudson bay regions, however, is somewhat lighter colored than this specimen, which, in its darkness and richness of shade, rivals the best examples of *pacificus*. In size, and ratio of length to width, the skull of the Quebec specimen is typical, but the nasals are too narrow to serve as a standard for *canadensis*, whose nasals average wider than *pacificus* and narrower than *frondator*. In general terms, *canadensis* differs from *frondator* in smaller size, narrower tail, much darker coloration and narrower nasals. It differs from *carolinensis* in smaller size, narrower, longer nasals and somewhat darker coloration. From *pacificus* it differs in smaller size, lighter coloration, wider nasals and broader skull. Subspecies *pacificus* differs from *frondator* in larger size, greatly narrowed and lengthened tail-paddle, rostrum and nasals, and in its dark coloration. In color *frondator* is decisively and uniformly lighter than eastern *canadensis* and *carolinensis* and western *pacificus*, but darkened *canadensis* (not melanistic) are nearly as dark as *pacificus*. In size, *pacificus* is much the longest of the three, with very long hind foot and tail. Its skeleton is slenderer and weaker in every part as compared with the massive frame of *canadensis* and *frondator* of same age. *Carolinensis* is nearly of the color of

\* Ridgway's *Nomenclature of Colors* is the standard used throughout this paper.

† The narrow nasals of this specimen are an exception, the average of several east Canadian specimens showing the ratio of length to breadth as less than two to one.

lighter hued *canadensis*, but agrees with all the other characters of *frondator*, to which it seems most nearly allied in cranial and caudal characters.

*Specimens Examined*.—New Brunswick, 1 skull; Quebec, 1 skin with skull; Canada (?), 3 skulls, 1 skeleton, 2 mounted skins; Ft. Simpson, N. W. T., 1 mounted skin; Idaho, 1 skin with skull.

CAROLINIAN BEAVER. *Castor canadensis carolinensis*, subsp. nov.

Plate XXIII; Figs. 1 and 2.

*Type Locality*.—Dan river, near Danbury, Stokes county, North Carolina. Type No. z.607, old ad. ♂, in the collection of the North Carolina State Museum, Raleigh, N.C. Collected by a trapper in flesh for the Museum, April, 1897.

*Geographic Distribution*.—Carolinian fauna, south into the Austroriparian.

*Color*.—Of type and topotype: Overhair of upper head, neck, back and sides, bright hazel. Underfur of same parts, seal brown. Hinder back and rump lightening from hazel to cinnamon rufous and then to tawny olive near base of tail. Vent and under base of tail, dark, rich burnt umber. Ears pale blackish. Sides of head below eyes light hair brown, shaded with pale cinnamon rufous. Feet bistre. Below, from throat to vent, dark broccoli brown with wood-brown tips to overhair.

*Anatomical Characters*.—Size large, larger than *canadensis*, with relatively much broader tail, as in *frondator*.

Skull large and broad, with very short, broad nasals. In the type the base of nasals does not reach back to the line connecting the anterior walls of the orbits. Rostrum very short and broad. Audital bullæ remarkably contracted laterally, with a strongly developed osseous column on the outer wall and the transverse diameter less than the longitudinal. Incisors weak, narrowed; molars large, with triangular crowns. Pelage short and harsh as compared with *canadensis*.

*Measurements*.—Of the type, from carcass: Total length, 1130 mm.; scaly portion of tail, 279 by 158 mm.; hind foot, 184 mm.; ear, from crown, 21 mm.; length of skull, 148 mm.; breadth of skull, 107 mm.; length of nasals, 43.5 mm.; breadth of nasals, 29 mm. Of the topotype (ad. ♂): Total length, 1080 mm.; scaly portion of tail, 260 by 146 mm.; hind foot, 174 mm.; ear from crown, 23 mm.

*Remarks*.—The two skins and four skulls upon which the above diagnosis of *carolinensis* is based were secured, just before the completion of this paper, from the authorities of the State Museum of North Carolina. They are intended to form a group exhibit in the State Museum, and have been carefully measured by the curator, Mr. H. H. Brimley, while yet in the flesh. The old male which forms the type had lost one of its fore feet,

apparently in a trap, some years previous to its final capture, but its evident health and great size show that it had suffered little inconvenience from the loss of the member.

The strong cranial and caudal affinities which this beaver shows to *frondator* as distinguished from *canadensis* indicate that it is more closely related to the western form. In color, however, it shows a nearer approach to *canadensis*, as, in fact, do many other animals of similar distribution and racial differences. The Mississippi and Louisiana beavers are undoubtedly, from what I can hear from the furriers, the darkest and thinnest pelted of our American beavers, but their separability from what I have named *carolinensis* is not probable. They may be considered as belonging to *carolinensis* rather than to *frondator*.

*Specimens Examined.*—Stokes county, North Carolina, 4.

SONORAN BEAVER. *Castor canadensis frondator* Mearns.

Plate XXI; Fig. 2. Plate XXII; Fig. 2.

*Castor canadensis frondator* Mearns, *Proc. U. S. Nat. Mus.*, XX, adv. sheet, Mar. 5, 1897.

*Type Locality.*—San Pedro river, Sonora, Mexico, near monument No. 98, of the Mexican boundary line.

*Geographic Distribution.*—Southern interior of North America from Mexico to Wyoming and Montana, intergrading northwardly into *canadensis*, southeastwardly into the trans-Mississippi *carolinensis* and westwardly into *pacificus*.

*Color.*—Much paler than *canadensis* or *carolinensis*. “Above russet, changing to chocolate on the caudal peduncle above and to burnt sienna on the feet; toes reddish chocolate. Below grayish cinnamon, brightening to ferruginous on the under side of caudal peduncle. Sides wood brown enlivened by the tawny-olive color of the over-hair.”\* A specimen from Red Lodge, Montana (No. 32, collection of E. A. and O. Bangs), taken in November, is wood brown above and below, the longer overhair of upper pelage washed with pale rusty.

*Anatomical Characters.*—Size large, exceeding average of Hudson bay beaver, with a longer foot and broad tail. Scaly portion of tail less than twice as long as wide, hind foot with claw about 185 mm. Skull massive, large, with short rostrum and very wide, short, tumid nasal bones, the average skull probably exceeding *canadensis* in size, certainly exceeding it in relative width to length and in the relative breadth of the nasals. Upper molar dentition as in *canadensis*.

*Measurements.*—Of the type: Total length, 1070 mm.; tail vertebræ from anus, 360 mm.; scaly portion of tail, 290 by 125 mm.; hind foot, 185 mm.; length of skull, 133

\* Quoted from Dr. Mearns' original description (*l. c.*) of type.

mm.; breadth of skull, 99 mm. Maximum length of old males, measured by Dr. Mearns, 1130 mm.; of the tail paddle, 285 by 155 mm.

*Remarks.*—Dr. Mearns' comparisons of *frondator* with *canadensis* were evidently not made with the largest specimens of the latter, as I have examined some whose cranial and body measurements are about equal to the maximum recorded by him for *frondator*. Nevertheless, there is little doubt that the larger size of average *frondator* is well established. Its long hind foot, broad tail and light coloration distinguish it immediately from *canadensis*. Its approach to *pacificus* is solely along the line of great size as indicated by the length of body and hind foot, but in cranial characters, as also in color, it is farthest removed from that race. The close anatomical relation of *frondator* to *carolinensis* has been mentioned.

*Specimens Examined.*—Montana, 1 skin with skull; Wyoming, 1 skull.

PACIFIC BEAVER. *Castor canadensis pacificus*, subsp. nov.

Plate XXI; Fig. 1. Plate XXII; Fig. 1.

*Type Locality.*—Lake Kichelos, Kittitass county, Washington; altitude about 8000 feet. Type, No. 1077, ad. ♀, in the collection of S. N. Rhoads; collected in April, 1893, by Allan Rupert.

*Geographic Distribution.*—Pacific slope, of America, from Alaska to California.

*Color.*—Above with very uniform, dark and glossy reddish chestnut overhair, almost concealing along dorsum the seal-brown underfur. Top of head like back; sides of head, throat, rump, thighs and vent not decidedly lighter than back and belly as in the other forms, these parts paling to walnut brown. Overhair of sides and under parts, between seal brown and broccoli brown; under fur of belly drab gray at the roots; hind feet dark seal brown; fore feet and limbs, dark wood brown. Ears black.

*Anatomical Characters.*—Size, largest of the *canadensis* group, but of more slender build, the skeleton throughout being of much greater longitudinal and lesser lateral dimensions than in the other forms. Tail and hind foot relatively long. Skull large, relatively narrow, with long, narrow rostrum and nasals, the latter with outer margins nearly parallel and reaching basally decidedly beyond the premaxillaries. Upper molar dentition weak, the crowns of molar teeth rectangular.

*Measurements.*—Of the type from carcass: Total length, 1143 mm.; tail vertebræ, 330 mm.; (from relaxed skin) scaly portion of tail, 295 mm. by 122 mm.; hind foot, 185 mm.; length of skull, 142 mm.; breadth of skull, 101 mm.; length of nasals, 53.6 mm.; breadth of nasals, 24 mm.; average length and breadth of five skulls from Tacoma and Lake Kichelos, Washington, 144 mm. by 99 mm.; average nasal length and breadth of same, 54 mm. by 23 mm.

*Remarks.*—Reliable measurements of only one adult skin specimen (the type) of *pacificus* were accessible. An adult mounted specimen from Josephine county, Oregon, in the Wagner Institute, Philadelphia, confirms the color and measurements of the type so far as the latter can be ascertained from the stuffed animal.

*Pacificus*, like its associates, *Mustela americana caurina* and *M. canadensis pacifica* of the Pacific slope regions, is distinguishable by its rich and deep coloration from its darkest trans-Cascadian representatives. No specimens have come to hand from Alaska, but undoubtedly, from what we know of other species found there as well as from the accounts of trappers and furriers, the Alaskan coast beaver represents the maximum of size\* and the greatest richness and depth of fur coloration seen in American beavers.

*Specimens Examined.*—Washington, Tacoma, 1 skeleton, 1 skull; Lake Kichelos, 1 adult skin with skull, 3 young skins with skulls, 1 skeleton, 12 separate skulls; Oregon, Josephine county, 2 mounted specimens; British Columbia, (?) Sumas, 1 skull; † Victoria, 1 skull.

### THE OTTERS OF NORTH AMERICA.

As Mr. Oldfield Thomas has shown in his "Preliminary Notes on the Species of Otter," published in 1889 in the *Proceedings of the London Zoölogical Society*, the characters and nomenclature of the North American species are in great need of study. Dr. Elliot Coues has elucidated with sufficient clearness, in his *Monograph of the Mustelidæ*, the habits and characters, and, to some extent, the synonymy of the typical Canadian otter, *Lutra hudsonica* Lacépède. Its relations, however, to other nominal species, especially to the otters of the Pacific slope of America from California northward, demand investigation.

As in the case of the American beaver, just treated, this paper has to do solely with one central Canadian type and its subspecies found in America north of Mexican territory.

Avoiding a general preliminary discussion of the rather perplexing questions of nomenclature and geographic variations and distribution, I will present these in order in the more formal and detailed synopses which follow.

\* Dr. Allen's measurements of Alaskan skulls, page 447 of the *Monograph of N. A. Rodentia*, do not indicate unusual size, but as we have no precise locality given they may not have come from the coast region, and, therefore, do not represent *pacificus*.

† This skull (No. 5545, ♂, coll. of E. A. and O. Bangs) is the largest of which I find any record, measuring 154 by 108 mm. The next in size is No. 2146, U. S. Nat. Mus., from Nebraska, recorded by Baird. Its size was 147 by 105.5 mm. Unlike all my *pacificus* specimens, No. 5545 has very wide convex nasals.

HUDSONIAN OTTER. *Lutra hudsonica* ("Lacépède," Desmarest).

## Plate XXIV ; Figs. 1 and 2.

*Mustela lutra* Linn., *canadensis* Schreber, *Säugt.*, III, Pl. CXXVI, B. (dated 1778 on title-page, but, according to Sherborn, the text of Vol. III was published in 1777 and this plate in 1776).

*Mustela (lutra) canadensis* Kerr, *Linn. An. Kingd.*, I, 1792, p. 173 (see Thomas, *Proc. Zoöl. Soc. Lond.*, 1889, p. 197, and Allen, *Bull. Amer. Mus. N. Hist.*, VII, 1895, p. 188).

"*Mustela hudsonica* Lacép.[ède]," Desmarest, *Nouv. Dict. d'Hist. Nat.*, XIII, 1803, p. 384; (*Nouv. Ed.*) 1817, p. 219.

*Lutra canadensis* J. Sabine, *App. Frankl. Jour.*, 1823, p. 653, and of nearly all subsequent authors (not *L. canadensis* F. Cuvier, *Dict. Sci. Nat.*, 1823, p. 242; see O. Thomas, *l. c.*, p. 197).

*Lutra hudsonica* F. Cuvier, *Suppl. Buff.*, I, 1831, p. 194; Merriam, *N. Amer. Fauna*, No. 5, 1891, p. 82.

*Lataxina mollis* Gray, *List Mamm. Brit. Mus.*, 1843, p. 70.

*Lutra destructor* Barnston, *Canad. Nat. and Geolog.*, VIII, 1863, p. 147, Figs. 1 to 6.

*Type Locality*.—“Ou la trouve au Canada sur les bords de la mer.”

*Geographic Distribution*.—Northern North America from the Arctic ocean southward into the United States and from the Atlantic ocean to the Cascade mountains; intergrading southeastwardly into subspecies *lataxina* F. Cuvier and *vaga* Bangs, southcentrally into subspecies *soronæ* Rhoads, and westwardly into subspecies *pacifica* Rhoads.\*

*Color* (taken from two specimens in the Bangs collection, No. 5638, yg. ad. ♂, Annapolis, Nova Scotia, November 23, 1896, and No. 4190, ad. ♀, Upton, Me., October 25, 1895).—Above, dark seal brown from nose to tip of tail, darkest posteriorly, below from breast to tail between broccoli and vandyke brown in the Nova Scotia specimen and between seal and vandyke brown in the Maine specimen. Head and neck below a line running from nose to lower base of ear and base of foreleg light Isabella color anteriorly darkening on lower neck to wood brown in the Nova Scotia animal. In the Maine specimen the neck is Prout's brown. Feet, legs and tail corresponding to darker shades of upper and lower body. A summer specimen from New Brunswick is dark, vandyke brown, but little paler below than on back, and darker than winter specimens of *lataxina* from Maryland.

\* The otters of Louisiana and Mississippi are stated by furriers to be very dark and light-pelted, resembling South Florida and Gulf-coast skins. No specimens having been examined, they are referred to *vaga*.

*Anatomical Characters.*\*—Size, medium (exceeded by *vaga*, *sonora* and *pacifica*). Tail relatively short. Inferior webs of feet and interspace between posterior and anterior callosities of manus, densely haired. Hind foot with claw about 125 mm. in old adults; but so variable as to have little diagnostic value. Total length rarely exceeding 1100 mm. Skull—size, medium (greatly exceeded by *vaga* and *pacifica*). Teeth large, crowded longitudinally upon each other and obliquely overlapping. Postorbital neck of frontals relatively short and wide, its superior ridge on a plane with nasals and occipital crest. Mastoid width much less than zygomatic width. Postorbital processes short and stout. Audital bullæ large, tumid, rising abruptly from the sides of basioccipital.

*Measurements.*—See tables.

*Remarks.*—Variations in the size of adult otters from apparently the same region seem remarkable at first sight, but I find that these are not always to be attributed to sex (for the female otter sometimes reaches near to the average size of the males), but to environment. The otters of the Alleghany mountain streams are uniformly smaller than those of the tide-water creeks and rivers of the Atlantic seaboard. This rule applies from Labrador to Florida and is undoubtedly the result of the relative difficulty of obtaining food and securing shelter from enemies in the two kinds of habitat. On the other hand, this difference lies wholly within the limitations of individual variation and in no sense affects the well-defined cranial and other characters which distinguish the races and species hereafter defined. It has to do solely with size, not with proportions. In a letter from Mr. C. S. Brimley, of Raleigh, North Carolina, the same feature is alluded to where he states: "A trapper of our acquaintance says that otters from the saltmarshes of eastern North Carolina average considerably larger than the otters of the small streams of the central part of the State."

There is rarely to be found a case in mammalian nomenclature more puzzling than that of the first tenable name of the Hudsonian otter. Its synonymy involves that of the mink and the fisher as well as the questions of priority of publication of Erxleben's and Schreber's great works on the Mammalia, and the tenability of plate names. I have consulted Drs. C. H. Merriam and T. S. Palmer at length on these questions and have accepted their ruling as to the first tenable name of the Hudsonian otter being *Lutra hudsonica* Lacépède and that of the northeastern mink to be *Putorius vison* Schreber. In regard to the name of the fisher, however, I prefer to abide by Canon XLIII of the Code of the American Ornithologists' Union, which accepts, under certain conditions, the names of species originally published on plates, which Drs. Merriam and Palmer and Mr. Sherborn do not accept. Returning now to the abstract of synonymy as given above for the Hudsonian otter, the case may be concisely stated thus: *Mustela lutra*

\* The diagnostic value of the nose pad has no significance in this study of the relationships of a monotypic group.

*canadensis* Schreber is a plate name published (*fide* Sherborn) in 1776, and is the earliest applied to this otter. It would stand (A. O. U., Canon XLIII) were it not unquestionably applied and intended by Schreber merely as a geographic name without reference to its specific relations to "*Mustela lutra* Linn." For this reason alone it should be discarded. Furthermore, the name *Mustela canadensis* was used by Schreber on a previous plate in the same volume (Pl. No. 126) in the specific sense for the fisher. This plate was also (*fide* Sherborn) published in 1776, one year before the text, which was published in 1777, and the bound volume of text and plates were dated 1778. In 1777, Erxleben published a description of the fisher and named it *Mustela pennantii*, by which name it has been since designated by authors generally. As this name is antedated by the tenable plate-name *Mustela canadensis* of Schreber by one year, I adopt it as the name of the fisher of Pennant from the northeastern United States. Erxleben published in the same work a description of an animal which he named *Mustela canadensis*, and which Baird and Coues have considered applicable to the mink, and the acceptance of the dates on the title-pages of Schreber's (1778) and Erxleben's (1777) works would give priority to Erxleben's name and displace *Mustela vison* of Schreber. But Sherborn's emendation of these dates makes *M. canadensis* of Erxleben for the mink untenable, it being preoccupied by Schreber's plate-name *M. canadensis* for the fisher, as stated above. Besides this fact, Dr. Merriam considers that Erxleben's description of *M. canadensis* also applies to the fisher and the marten in such a way as to make it untenable for any species.

Returning to the search for a first name for the otter, we find Kerr's name, *M. canadensis* of 1792, to be unavailable because he placed it under the old genus *Mustela*. Next in order appears to be the name *hudsonica*, which is accredited to Lacépède, in an article on the Canadian otter in the first edition of the *Nouvelle Dictionnaire d'Histoire Naturelles*, which is signed "Desm." I have not examined this reference personally, but am indebted to Dr. J. A. Allen for a transcript of these facts from the only known copy of the work in America which appears to be available, belonging to the library of the American Museum of Natural History. In agreement with my previous rendering of manuscript names, and on the supposition that Desmarest was the real author and publisher of this name and description of *hudsonica*, I cite it as *Lutra hudsonica* ("Lacépède," Desmarest). I agree with Dr. Merriam that this name should stand for the otter of eastern Canada. Frederick Cuvier seems to have been the first to place this animal in the genus *Lutra* under the Lacépède-Desmarest name *hudsonica* in 1831.

The *Lataxina mollis* of Gray and the *Lutra destructor* of Barnston are no doubt synonyms of *hudsonica*.

*Specimens Examined*.—Labrador, Okak, 1 skull; Grand river, 1 skull; New

Brunswick, Restigouche river, 1 skin; Nova Scotia, Annapolis, 1 skin with skull; Maine, Upton, 1 skin with skull; Bucksport, 1 skull; Massachusetts, Kingston, 1 skin with skull; Westford, 1 skull; Canton, 1 skull; Missouri, 1 skull; British Columbia, Vernon, 1 skull; Alaska, Tanana river, 1 skull.

CAROLINIAN OTTER. *Lutra hudsonica lataxina* (F. Cuvier).

Plate XXIV; Fig. 4.

*Lutra lataxina* F. Cuvier, *Dict. des Sci. Nat.*, 1823, p. 242.

*Type Locality*.—South Carolina.

*Geographic Distribution*.—Carolinian faunal region, intergrading through the Transition region northward with *hudsonica* and southward through the Austrariparian into *vaga* of southern Florida.

*Color*.—Much lighter than *hudsonica*. Above (from a specimen taken at Liberty Hill, Conn., No. 4252, ad. ♂, Nov. 19, 1895, collection of E. A. and O. Bangs\*), dark vandyke brown, tipped on upper head, neck and shoulders with wood brown, darkening posteriorly. Upper feet and limbs dark bistre. Below, from lower breast to end of tail, between Prout's brown and broccoli brown. Head, neck and breast, including ears, below a line connecting nose, upper eyelid, upper ear and upper base of fore leg, grayish wood brown, lightest on head, darkening posteriorly to color (*l. c.*) of breast. The average Carolinian winter specimens from Maryland southward are somewhat lighter and some are Prout's brown above, the wood brown of lower head and neck becoming a pale grayish buff.

*Anatomical Characters*.—Size, smallest of the *hudsonica* subspecies. Inferior webs of feet and interspace between callosities of manus, sparsely haired. Hind foot with claw about 120 mm. Total length rarely exceeding 1100 mm. Skull relatively small, with very large teeth, and weak postorbital processes. In other respects like the *hudsonica* type.

*Measurements*.—See tables.

*Remarks*.—The relations of this subspecies to northern *hudsonica* on the one hand and to the southern *vaga* on the other are rather peculiar. It is without question a nearer ally to *hudsonica* than *vaga* in the territory between Connecticut and South Carolina, but, as Mr. Bangs has implied in his remarks on *vaga*, there is a tendency in the Georgia (and we may infer in the South Carolina) otter to the large size and peculiar

\* This specimen comes from the northern edge of the Carolinian region. No equally good skins from more southern localities being available, it is used as typical of the Carolinian race. It corresponds closely to two fine 1897-8 winter pelts of Maryland otters, examined through the courtesy of Mr. S. E. Shoyer, of Philadelphia.

skull and color characters of the south Florida animal. There is so much evidence of the intergradation of *lataxina* both north and south that the specific separation of *vaga* from it is not permissible. On the other hand it is impossible to ignore the decided racial differences of the Carolinian otter from the Hudsonian type.

Cuvier's original description of *lataxina* gives "Caroline du Sud" as the locality where the type was taken; it is, therefore, permissible to restrict this name to the Carolinian form as typified in the otters found in the Carolinian lowlands of the eastern United States from south of the "Transition Zone" of Dr. C. Hart Merriam, as far as middle South Carolina, Alabama and Mississippi, where it merges into *vaga* of the Gulf or southern "Austroriparian Realm" of Dr. J. A. Allen.

I know of no restricted synonyms of *lataxina*. Dr. Coues quotes in his *Fur-bearing Animals* a "*Latax lataxina* Gray, *Ann. Mag. N. H.*, I, 1837, p. 119." The work referred to contains no such name. Cuvier's description of *lataxina* gives its color as "dark blackish brown, a little paler beneath. Cheeks, temples, lips, chin and throat pale brownish gray, and under side of tail grayish brown, the hair tips reddish." He compares the skull of *lataxina* with his *Lutra enudris*, "Loutre de Guianæ" of the preceding page and remarks on the "straight line, even concave or depressed," joining the nasals and occiput. This is significant, as one of the peculiarities separating *vaga* from *lataxina* and *hudsonica* is the convexity of the frontal plane in the former.

*Specimens Examined*.—Connecticut, Liberty Hill, 1 skin with skull; Pennsylvania, Clinton county, 2 mounted specimens; Monroe county, 3 skulls; New Jersey, Tuckerton, 1 skull; Mickleton, 2 disarticulated skeletons; Maryland, 2 fresh cased winter furs; North Carolina, Raleigh, 2 skulls.

#### FLORIDA OTTER. *Lutra hudsonica vaga* Bangs.

##### Plate XXV; Fig. 2.

*Lutra hudsonica vaga* Bangs, *Proc. Bos. Soc. Nat. Hist.*, XXVIII, 1898, p. 224.

*Type Locality*.—Micco, Brevard county, Florida.

*Geographic Distribution*.—Florida, southeastern Georgia and the Gulf regions of Alabama, Mississippi and Louisiana, intergrading (?) northwardly into *lataxina*.

*Color*.—Dark; less black than *hudsonica*, darker and redder than *lataxina*. Breast and belly nearly unicolor with back. Paler area of head and neck, scarcely reaching breast. Above and below, dark, rich chestnut, scarcely paler on belly. Lower head and anterior throat below line from nose to and behind ears, strongly tipped anteriorly with tawny Isabella color darkening to raw umber on throat, the underfur darker than overfur, instead of lighter as in *lataxina*.

*Anatomical Characters.*—Size, large. Tail relatively long (*fide* Bangs). Inferior webs of feet and interspace of palms nearly naked. Hind foot with claw reaching maximum (No. 4998 Bangs Coll., yg. ad. ♂, Citronelle, Florida) of 130 mm. Total length (maximum of No. 4998, *l. c.*, 1285 mm.) exceeding 1200 mm. Skull large, teeth relatively small, not crowded longitudinally. Postorbital neck of frontals long and narrow, suddenly constricted at base. Frontal plane strongly upraised above a line connecting occipital crest with base of nasals and above the level of postorbital processes. Mastoid width nearly equaling the zygomatic width in very old specimens, in young adult skulls the mastoid width is the greater. Wings of mastoid processes strongly developed and flattened laterally. Audital bullæ as in *hudsonica* and *lataxina*; well developed, tumid at basioccipital margins. Postorbital processes relatively weak and slender. Underfur short, sparse.

*Measurements.*—See tables.

*Remarks.*—This subspecies just described by Mr. Bangs in his most valuable paper on Florida and Georgia mammals is, as already noticed, quite different from *lataxina*, its nearest geographic ally. In color it comes nearer *hudsonica* intermediates from New England. In size and color and lack of hair on the webs and palms it shows approach to the remote *pacifica*, but its peculiar long-waisted and broad-based skull distinguishes it from all other American forms except, perhaps, those of the northern Central American and South American otters which I have examined. The yellowish and reddish shades of south Florida *vaga* suggest affinity with what we find published of the characters of the otters of the Caribbean coasts. In essential respects Mr. Bangs' diagnosis of this animal is very good. He, however, used the skull of a young adult male for cranial comparisons, and while it is true that the ratio of the mastoid to the zygomatic width is much greater in *vaga* than *hudsonica* it is not as great as would appear by Mr. Bangs' figure. In crania of old adult *vaga* in my collection the mastoid and zygomatic widths are about equal, the latter slightly wider. In *hudsonica*, however, the excess of zygomatic width and slight development of the mastoid wings is marked.

*Specimens Examined.*—Florida, Tarpon Springs, 1 adult pelt, 3 young skins with skulls and 2 extra skulls; Salt Run, St. John's river, 1 skull.

#### PACIFIC OTTER. *Lutra hudsonica pacifica*, subsp. nov.

Plate XXIV; Fig. 3. Plate XXV; Figs. 1 and 3.

*Lutra paranensis* and *aterrima* Thomas, *P. Z. S.*, *l. c.*, p. 199; Trouessart, *Catal. Mamm.*, 1897, pp. 286, 287 (not of Pallas, *Zoogr. Ross. Asiat.*, 1811, p. 81).

*Lutra californica* Baird, *Mamm. N. Amer.*, 1857, p. 187 (not of Gray, *Mag. Nat. Hist.*, I, 1835, p. 580, which is *L. felina*; see Thomas, *l. c.*, p. 198).

*Type Locality.*—Lake Kichelos, Kittitass county, Washington; altitude about 8000 feet. Type No. 616, yg. ad. ♂, in the collection of S. N. Rhoads; collected in fall or winter\* of 1892-'93, by Allan Rupert.

*Geographic Distribution.*—Pacific slope of North America, from Alaska to California.

*Color.*—Of type: Lighter than *hudsonica*, with a browner cast, approaching nearly to *lataxina*. Average of coast specimens from Puget Sound northward, ruddy seal brown, sometimes very dark in Alaskan coast specimens. Lower parts from breast to end of tail much lighter (Mars-brown) than back. Ventral region conspicuously lighter. Lower head, neck and breast very pale wood brown, almost dirty gray.

*Anatomical Characters.*—Size, very large.† Tail normal. Inferior webs of feet and palmar interspaces nearly naked. Hind foot not recorded in type, the calcaneum missing; no measurements of other specimens available. Skull largest of the North American otters (reaching a maximum of 119 mm. in occipito-nasal length and 83 mm. in zygomatic expanse in an Alaskan coast example); teeth relatively weak, less crowded longitudinally than in *hudsonica*. Interorbital width relatively very great, nearly 1½ times postorbital constriction; postorbital processes long and stout. Mastoid and zygomatic proportions as in *hudsonica*. Audital bullæ remarkably flattened.

*Measurements.*—See tables.

*Remarks.*—The type specimen, though taken in the mountains and not fully mature, is large and has a skull which would have, perhaps, eventually equaled the maximum size recorded above for an Alaskan specimen of much greater age. A very old female skull from the vicinity of Puget Sound confirms fully the diagnostic characters of *pacifica* as given.

In treating of the otters of the Pacific slope of America we are confronted with two nominal species to which they have been doubtfully referred by authors. In point of time the first to be considered is the *Viverra aterrima* of Pallas,‡ described from a hunter's skin, lacking skull and feet, taken in northeast Siberia, "between the Uth and Amur rivers." Schrenck and Middendorff listed this animal in their works on Siberian Zoölogy with the remark that they were unable to verify its existence or clear up the mystery of its strange characters as given by Pallas. Mr. Thomas (*P. Z. S.*, l. c., p. 199) queries, on the basis of a mistaken suggestion of Dr. Coues, whether it may

\* The season of capture was not recorded, but the pelt indicates that it was taken in full winter fur.

† I have no measurements of Alaskan otters, but judging by the great size of the skulls from there they must greatly exceed any known species of *Lutra*. On the basis of the skull they must attain a maximum length of over 1400 millimeters.

‡ *Zoog. Rosso. Asiat.*, l. c.

not prove to be the same as the so-called *Lutra paranensis* Rengg. which he assumed might occur throughout the whole Pacific coast regions of America. The close relationship of our Pacific coast otters to *hudsonica* will effectually remove them from any complication with *paranensis*, but as regards *aterrima* we must devote sufficient space to show the impossibility of referring the Alaskan land otter to that animal, as Trouessart has lately done.\*

A careful study of Pallas' original description, together with the fact that no later author or explorer has been able to explain or rediscover the animal, convinces me that it is either unidentifiable or will prove not to belong to the *Lutrinæ* but to the *Mustelinæ*. Pallas states it to be intermediate in size between the European otter and the European mink. He states the length of the skin to be 19 inches, 3 lines, and of the tail 5 inches with a *brush of 1½ inches!* The color of the animal is said to be very black and shining, except the sides of the head between the eyes and ears, which change from black to "subrufescent." The absurdity of applying such a description to the animal which I have named *pacifica*, or, indeed, to any member of the genus *Lutra*, is certainly evident. So far as any animal now known to zoölogists is concerned, the *Viverra aterrima* of Pallas should be consigned to oblivion.

Another name which has given trouble to those who had to deal with the Pacific coast otter is the *Lutra californica* of Gray. Fortunately, Mr. Thomas has effectually exposed the history and at the same time the inapplicability of that name to a North American animal of the *hudsonica* type. He has shown in his paper in the *Proceedings of the Zoölogical Society* (*l. c.*, p. 198) that Gray's type of *californica* did not come from California, but most likely from Patagonia, in which case he makes it a synonym of *Lutra felina* Molina.

*Specimens Examined.*—Washington, near Tacoma, 3 skulls; Lake Kichelos, 1 skin with skull, 1 skull; Oregon, 1 skull; British Columbia, Sumas, 1 skull; Alaska (coast?), 3 skulls; Kodiak Island, 2 skulls; Mission, 1 skull; Queraquina† Island, 1 skull.

SONORAN OTTER. *Lutra hudsonica sonora*, subsp. nov.

*Lutra canadensis* Mearns, *Bull. Am. Mus. Nat. Hist.*, III, 1891, pp. 253–256.

*Type Locality.*—Montezuma Well, Beaver creek, Yavapai county, Arizona. Type, ad. ♀, No.  $\frac{371}{309}2$  in the collection of the American Museum of Natural History. Collected December 26, 1886, by Dr. Edgar A. Mearns.

\* *Catalogus Mammalium, l. c.*

† It is conjectured that this skull came from the North Pacific. It has Capt. T. J. Turner's name on it. I cannot find an island of this name on the maps.

*Geographic Distribution.*—Arid southern interior of North America, from Mexico, probably to Wyoming.

*Color.*—Of type, *fide* Mearns, *l. c.*: “Above dark brown, without reddish tinge ; this color changing gradually to a light grayish brown below, being palest (almost whitish) upon the sides of the head below the level of the eyes and upon the under side of the head and neck as far back as the fore limbs. . . . The long hairs of the lighter portions of the body are pointed with yellowish gray and upon the upper surface of the head and neck the tips of the hairs are yellowish brown, giving a paler cast to that part of the dorsum.”

*Anatomical Characters.*—Size, large, with a very long hind foot, the body length measurements exceeding those of any other specimen of North American otter examined or recorded.\* Webs of feet not densely haired beneath. Hind foot, 145 mm. Total length reaching 1300 mm. Skull—size, large, nearly as great as in largest Alaskan *pacifica*, but small for the great relative length of body, “less massive, broader, with more evenly rounded zygomatic arches and with the brain case more convex or bulging in its outlines.” “Arizona skulls differ from all others in the slender, attenuated postorbital processes and in the greater height of the lower jaw from angle to condyle, or to summit of coronoid process. From its geographically near neighbor, *L. felina* of Central America, it presents many cranial and dental differences ; in fact, skulls of the latter are so very distinct [in their inferior concavity, frontal depression, short muzzle, narrow postorbital constriction and absence of the heel in front of the antero-internal cusp of the last upper molar] from any known specimens from North America, north of Mexico, as to be distinguishable from them at a glance.”

*Measurements.*—Of type : “Total length, 1300 mm.; head and body (measured from tip of nose to anus), 815 mm.; tail measured from anus to end of vertebræ, 472 mm. . . . ear, height above crown, 15 mm.” No skull measurements given.

*Remarks.*—I have accepted Dr. Mearns’ very full and satisfactory diagnosis of the Arizona otter, given in the *Bulletin of the American Museum of Natural History*, as conclusive evidence of the existence of a recognizable race in arid interior America, south of Montana. Its great size and light color together form a combination not found in any other known or named otter.

It has been thought unnecessary to examine the type, as, owing to the author’s removal from Philadelphia during the completion of this paper, such an examination would have caused a greater risk to the type specimens than the facts warranted.

\* The great size of the type, as compared with an adult male also recorded by Dr. Mearns from Arizona, indicates that the sex of the type may have been wrongly determined. If correct, the size to be expected of a full-grown male *sonora* would be extraordinary.

NEWFOUNDLAND OTTER. *Lutra degener* Bangs.

## Plate XXIV; Fig. 5.

*Lutra degener* Bangs, *Proc. Biol. Soc. Wash.*, XII, 1898, p. 35.

*Type Locality*.—Bay St. George, Newfoundland.

*Geographic Distribution*.—Confined to Newfoundland (?).

*Color*.—Of type, ad. ♂, taken April 22, 1897: Above, black with seal brown reflections. Ears, seal brown. Lower head and neck areas grayish wood brown, becoming seal brown on breast; the remainder of lower parts nearly as dark as back. Tail unicolor. Feet seal brown and densely haired on under side of webs and palmar interspaces.

*Anatomical Characters*.—Size, much smaller than any of the *hudsonica* group. Hind foot small, with claw averaging about 112 mm.\* long in the two specimens examined. Total length about 1000 mm. Tail relatively short. Skull very small, narrowed, weak and fragile; the brain case wide anteriorly; the frontal and interorbital widths narrow and the postorbital processes weak and slender, strongly grooved on their superior face. Sagittal crest not developed even in old specimens. Interorbital constriction about equal to postorbital constriction. Teeth weak, with normal cuspidation. Audital bullæ normal.

*Measurements*.—See tables.

*Remarks*.—The type specimens of *degener*, so generously loaned to me by Mr. Bangs, when compared with the large series used in the preparation of this paper, convince me that this depauperate insular form has no intercourse with the larger typical *hudsonica* of Labrador and New Brunswick. A skull from Grand river, Labrador, shows no approach to the *degener* type, and another from Okak, Labrador, agrees in the same differences. A young adult skull and skin of *hudsonica* from Nova Scotia, and an adult summer skin from New Brunswick, show that the maritime otter of the mainland sometimes attains a size nearly one-third larger than the largest known specimens of old, adult *degener*.

*Specimens Examined*.—Newfoundland, Bay St. George, 2 skins with skulls, 1 extra skull.

## THE FISHERS OF NORTH AMERICA.

Apology must be made for the inferior series of skins and skulls which form the basis of the subjoined remarks on the Pekan. They serve, however, to elucidate some

\* The collector's measurement of the hind foot of type is given on label as "126 mm." This is certainly incorrect, as the length determinable by feeling the calcaneum in the dry skin could not have exceeded 115 mm. This accords with the small size of the hind foot and the length of other specimens of *degener*.

questions sure to be soon brought up in the active advance of monographic work in American mammalogy.

The synonymy of Pennant's Fisher has already been discussed under *Lutra hudsonica*, and I have there given reasons for my adoption of the plate-name *canadensis* of Schreber as having priority over the long-accepted name *pennanti* of Erxleben for this animal.

PENNANT'S FISHER. *Mustela canadensis* Schreber.

*Mustela canadensis* Schreber, *Saugt.*, III, p. 492, Pl. CXXIV. Text published in 1777, plate in 1776 (*fide* Sherborn).

*Mustela pennantii* Erxleben, *Syst. An.*, 1777, p. 470.

*Mustela melanorhyncha* Boddaert, *Elench. An.*, 1784, p. 88.

*Viverra piscator* Shaw, *Gen. Zoöl.*, I, 1800, p. 414.

*Mustela nigra* Turton, *ed. Linn. Syst. Nat.*, I, 1802, p. 60.

*Mustela godmani* Fischer, *Syn. Mamm.*, 1829, p. 217.

*Type Locality*.—“New York and Pennsylvania,” Pennant.

*Geographic Distribution*.—Northern North America, east of the Cascade mountains, from the northern limit of trees to Colorado and North Carolina in the mountains. Intergrading on the Pacific slope into subspecies *pacifica*, and probably in the southern Rocky mountain region into a paler race. Probably represented in the Hudsonian faunal region by a subspecies.\*

*Color*.—From an adult, male, winter specimen taken near Lancaster, Pa., March 11, 1896, and in the possession of Dr. M. W. Raub, of that city, who furnished the description: “Head and one-half of the length of body, gray and black mixed, gray predominating; throat darkest, with snout from tip to line of eyes dark brown. The hinder half of body gradually darkens into a deep chocolate color until it reaches the tail, which is almost black with a tip entirely black. Hind legs and tail, viewed at a distance of six feet, look very dark, almost pure black. The fore legs are black but not so deep. Tips of ears, darkest.”

Two specimens from the Bangs collection, one from Moosehead lake, Maine, the other from Idaho county, Idaho, seem to answer closely the above description. The light upper and forward portions of body are a grizzled grayish brown, the long hairs black tipped. The basal half of hairs of anterior back are hair brown. I can discover no color characters to separate the Idaho specimen from the one from Maine, nor do the skulls indicate any reliable differences. The Maine skin (of an animal two-thirds grown)

\* Typical *canadensis* must be restricted to the Alleghenian form.

has white patches on lower fore leg, breast and vent, and an immature specimen of *pacifica* has white spots on throat, arm-pits and vent. The four adult specimens examined are not thus pied. Dr. Coues, in his *Fur-bearing Animals*, says that the fisher is an exception to the marten, mink and weasel in not having these patches. They may disappear with age in the fisher, but they do not in the other species.

*Anatomical Characters.*—Size, smaller than subspecies *pacifica*. Skull small; nasals relatively short, less elongate at basal apex. Posterior upper molar relatively small, its inner lobe not greatly developed longitudinally so as to only slightly exceed the breadth of outer lobe; neck of crown of same tooth but slightly constricted.

*Measurements.*—Of Dr. Raub's Pennsylvania specimen, old ad. ♂, *l. c.*: Total length, from end of nose to end of tail hairs, 965 mm.; tail vertebræ, 318 mm.; hind foot, 115 mm.; ear from crown, 27 mm. A mounted specimen, No. 507, Academy Natural Sciences, adult ♂, from "Pennsylvania," has a total length of 1000 mm., with tail (minus brush), 390 mm., and hind foot, 112 mm., taken from the dry mount. The Idaho specimen, No. 6964, young adult ♂, coll. of E. A. and O. Bangs, is 978 mm. long, with tail, 369 mm., and hind foot, 117 mm. Skull of No. 7437, yg. ad. ♂, Greenville, Me., total length, 117 mm.; zygomatic width, 63 mm.; mastoid width, 54 mm.; mesial nasal length, 22 mm.

*Remarks.*—The characters of the Pennsylvania fishers above enumerated, so far as they are based on reliable measurements and color diagnoses, may be considered as representing typical *canadensis*, based on Pennant's original notice of the animal. Whether a series of Alleghenian fishers will show the Hudsonian animal to be separable is an interesting question probably to be decided in the affirmative. The Idaho and Maine specimens examined, though not contrasted by me with Dr. Raub's specimen, must be very close to it. No skulls of Pennsylvania fishers have been examined, but the close resemblance of the Idaho skull to those from Maine, as indeed to *pacifica* also, strongly indicates that no cranial differences exist between the east American fishers of the north and south. The "saturated" color characters of *pacifica* are alone sufficient to distinguish it from all fishers found east of the Cascades.

*Specimens Examined.*—Pennsylvania, 1 mounted specimen (*fide* Dr. Raub, 1 mounted specimen); Maine, Mooseland lake, 1 skin with skull; Greenville, 2 skulls; Lincoln, 1 skull; Idaho, Idaho county, 1 skin with skull. Other specimens from eastern North America, 1 mounted, 2 old ad. skulls.

PACIFIC FISHER. *Mustela canadensis pacifica*, subsp. nov.

*Type Locality.*—Lake Kichelos, Kittitass county, Washington; altitude about 8000

feet. Type, No. 1074, old ad. ♀, in the collection of S. N. Rhoads; collected in the fall or winter of 1892-'93, by Allan Rupert.\*

*Geographic Distribution.*—Pacific slope of America, from Alaska to California.

*Color.*—Above, from between eyes to middle back, grizzled, grayish ochraceous heavily lined with black, becoming hazel black on hind back and dark black on rump, thighs and tail. Whole head, behind eyes clove brown basally, strongly grizzled with dirty white. Snout to eyes blackish seal brown. Chin, throat, breast and belly between dark chestnut and hazel, obscured with black. Legs and feet black, the fore legs showing the vandyke brown bases of hairs. Basal half of hairs of anterior back are Prout's brown as contrasted with the hair brown of *canadensis*.

*Anatomical Characters.*—Size, large, skull very large, with relatively long nasals. Posterior upper molar large, with spreading inner lobe much wider longitudinally than outer section of same tooth; the crown suddenly constricted at the middle.

*Measurements.*—Of type from relaxed skin: Total length, 1090 mm.; tail, 350 mm. without brush; hind foot not determinable, as the bones are missing. Measurements of a specimen two-thirds grown, No. 295, coll. S. N. Rhoads, from near Tacoma, Wash.: Total length (relaxed skin), 970 mm.; tail, 400 mm.; hind foot, 112 mm.; ear from crown, 21 mm. Skull of type: Total length from hinder end of sagittal crest to front end of premaxillæ, 125 mm.; zygomatic expansion, 73 mm.; mastoid expansion, 54 mm.; interorbital constriction, 28.5 mm.; postorbital constriction, 20 mm.; mesial length of nasals, 27 mm.

*Remarks.*—The dimensions of the type skull, when we consider it was from a female, show that the fishers of the Cascade mountains attain a much greater size than those of the Appalachian chain. Young adult skulls of the same age from western Washington and Maine show the same distinctions. The younger specimen from Tacoma, while approaching nearer to Idaho and Maine specimens in grayer color, is very much darker than they, the difference in shade between the anterior and posterior dorsal areas of the former being slight, while in the latter it is striking. The tawny suffusion so deeply marked in the type of *pacifica* and which separates it at a glance from *canadensis* is also noticeable in the Tacoma specimen.

*Specimens Examined.*—Washington, Lake Kichelos, 1 skin with skull, 2 skulls; near Tacoma, 1 skin, 1 skull; British Columbia, Sumas, 1 skull.

\* Mr. Rupert, whose business is hunting and trapping, first sent me the fresh skull of a very old ♀ fisher, which was entered in my catalogue as No. 621. I wrote him immediately that I would like to have the pelt belonging thereto, and in a later shipment the skin, which forms the type of *pacifica*, was sent on without label. As it is also from a female and a very old animal, I consider the skin and skull as belonging to the same individual.

*Skull Measurements of North American Otters (in millimeters)*

## NORTH AMERICAN BEAVERS, OTTERS AND FISHERS.

Collection.	Catalogue Number.	Sex.	Locality.	Species.	Zygomatic expansion.	Mastoid expansion.	Interorbital constriction.	Postorbital constriction.	Expanse of postorbital processes.	Length of postorbital frontal neck.	Remarks.
E. A. and O. Bangs	5638	yg. ad. ♂	Nova Scotia, Annapolis	L. hudsonica. ("La- ceP., Desm.)	113.5	72	68	27.7	35	15	Large, coast form.
do.	7431	old ad.	Labrador, Okak	do.	74.5	67	23	19	35	13.5	Coast form.
Aead. N. Sci. Phila.	3150	old ad.	Alaska, Tanana River	do.	105	72.5	65	20.8	20	10.5	Inland form.
Smithsonian Inst.	21483	old ad.	Maine, Bucksport	do.	102	72	63.5	24	18	12.5	Inland form.
E. A. and O. Bangs	4238	old ad. ♂	Pennsylvania, Monroe Co.	do.	109	73.5	66	25.5	21.5	14	Coast form.
do.	4188	old ad. ♂	New Jersey, Tuckerton	do.	112	76	69	26	22	15	Intermediate.
Acad. N. Sci. Phila.	3569	old ad.	New Jersey, Mickleton	L. h. latitarsis (F. Cuv.)	100	69.5	65	22.8	20	13	Inland interm., prob. ♀.
S. N. Rhoads.	1840	yg. ad.	North Carolina, Raleigh	do.	104.5	68	61	21.5	19	12	Probably ♂.
do.	1565	yg. ad.	Florida, Micco	do.	104	70	63.5	24.5	23	11	
do.	3896	yg. ad.	Florida, Roseland	do.	107	70	63	23		12	
E. A. and O. Bangs	3537	old ad. ♂	Florida, St. John's Riv., Vol-	do.	104	71	62	22	22	13.5	
do.	3538	yg. ad. ♀	Florida, Tarpon Springs	do.	103	65.5	61	21.5	21	11	
do.	5749	yg. ad. ♂	Washington, L. Kichelos	L. h. vaga Bangs	108	71	71.2	24	18.6	16	Type ( <i>fide</i> Bangs).
do.	4995	ad. ♀	Washington, near Tacoma	do.	[101]	70.3	67	21.8	17.8	30	( <i>fide</i> Bangs.)
WagnerInst., Phila	—	ad.	Alaska (coast ?)	do.	105	72	67	24	22	18.2	
S. N. Rhoads	1580	old ad. ♂	do.	do.	116	79	76.5	27	20.5	20	
do.	616	yg. ad. ♂	do.	do.	115.5	72.5	69	25	20	12	Type.
do.	303	old ad. ♀	Alaska (coast ?)	do.	110.5	77	70	29	21.5	16	
Smithsonian Inst.	8686	old ad.	do.	do.	113.5	74.5	70.4	27.3	24	16	Col. by Dr. T. T. Minor.
do.	8687	old ad.	do.	do.	119	83	76	34	25	14	do.
do.	8688	old ad.	do.	do.	110	78	73	27	18	15	do.
E. A. and O. Bangs	6965	yg. ad. ♂	Newfoundland, Bay St. George	L. degener Bangs	101	66	60	22	19.5	11.5	Type.
do.	6966	old ad. ♀	do.	do.	[98]	70	63	22.8	19.4	10	Topotype.
do.	3755	yg. ad. ♀	do.	do.	93	64	56	19	18.8	25.8	Topotype.

## CONTRIBUTIONS TO A REVISION OF THE

## Body Measurements of North American Otters (in millimeters).

Collection.	Catalogue Number.	Sex.	Locality.	Species.	Total Length.	Tail Vertebrae.	Hind Foot.	Remarks.
E. A. and O. Bangs	5638	yg. ad. ♂	Nova Scotia, Annapolis	L. hudsonica ("Lacép," Desm.)	1090	415 [123]	Large, coast form.	
do.	46	?	New Brunswick, Restigouche Riv.	do.	1190	393	115	Meas. taken from stuffed skin.
do.	4189	ad. ♂	Massachusetts, Kingston	do.	1168	457	124	Intermediate.
do.	4190	ad. ♀	Maine, Upton (L. Umbagog)	do.	1065	406	114	Inland type.
Acad. N. Sci. Phila.	3360	im. ♂	Pennsylvania, Clinton Co.	L. h. lataxina (F. Cuv.)	1016	360	115	Inland type, mounted spec'n.
E. A. and O. Bangs	4252	yg. ad. ♂	Connecticut, Liberty Hill	do.	1093	410	127	Intermediate.
H. H. and C. S. Brimley	451	ad. ♀	North Carolina, Raleigh	do.	1066	368	Weight, 15 lbs.	
do.	453	ad. ♂	do.	do.	1144	445	Weight, 17 lbs.	
do.	—	ad. ♂	do.	do.	1130	445	Weight, 16 lbs.	
E. A. and O. Bangs	4995	ad. ♀	Florida, Roseland	L. h. vaga Bangs	1100	400	110	
do.	4998	yg. ad. ♂	Florida, Citronelle	do.	1285	487	130	
S. N. Rhoads	616	yg. ad. ♂	Washington, Lake Kichelos	L. h. pacifica Rhoads	1117	419	128?	Type.
do.	302	yg. ad. ♂	Washington, near Tacoma	do.	1092	368	120	Meas. from ligamentous skeleton.
Amer. Mus. Nat. Hist.	3712	ad. ♀	Beaver Creek, Yavapai Co., Arizona	L. h. sonora Rhoads	1300	472	146	Type. Weight, 19 $\frac{7}{8}$ lbs.
E. A. and O. Bangs	6965	ad. ♂	Newfoundland, B. St. George	L. degener Bangs	998	358 [115]	109	Type.
do.	6966	ad. ♀	do.	do.	990	352	Topotype.	

## EXPLANATION OF PLATES.

## Plates XXI and XXII.

(Scale slightly less than two-thirds natural size.)

- Figs. 1 and 1. *Castor canadensis pacificus* Rhoads. Topotype; No. 1865, col. of S. N. Rhoads; old adult ♂, from Lake Kichelos, Kittitass county, Wash. Superior and inferior, vertical aspects of same skull.
- Figs. 2 and 2. *Castor canadensis frondator* Mearns. No. 32, col. of E. A. and O. Bangs; young adult ♀, from Red Lodge, Mont. Superior and inferior, vertical aspects of same skull.
- Figs. 3 and 3. *Castor canadensis* Kuhl. No. 31, col. of E. A. and O. Bangs; old adult (probably ♂), from New Brunswick. Superior and inferior, vertical aspects of same skull.

## Plate XXIII.

(Scale four-fifths natural size.)

- Figs. 1 and 2. *Castor canadensis carolinensis* Rhoads. Type; No. Z. 609, col. of State Museum of N. Carolina; old adult ♂, from Dan river near Danbury, Stokes county, N. Carolina. Superior and inferior, vertical aspects of same skull.

## Plate XXIV.

(Scale six-sevenths natural size.)

- Fig. 1. *Lutra hudsonica* ("Lacépède," Desmarest). No. 4188, col. of E. A. and O. Bangs; old adult ♂, from Canton, Mass. Superior, vertical aspect of skull.
- Fig. 2. *Lutra hudsonica* ("Lacépède," Desmarest). No. 1201, col. of E. A. and O. Bangs, old adult ♂, from Westford, Mass. Inferior aspect of skull.
- Fig. 3. *Lutra hudsonica pacifica* Rhoads. No. 8686, col. of Smithsonian Institution; old adult, from (the coast of?) Alaska. Inferior aspect of skull.
- Fig. 4. *Lutra hudsonica lataxina* (F. Cuvier). No. 3537, col. of E. A. and O. Bangs; old adult ♂, from Raleigh, N. Carolina. Superior, vertical aspect of skull.
- Fig. 5. *Lutra degener* Bangs. Type; No. 6965, col. of E. A. and O. Bangs; adult ♂, from Bay St. George, Newfoundland. Superior, vertical aspect of skull.

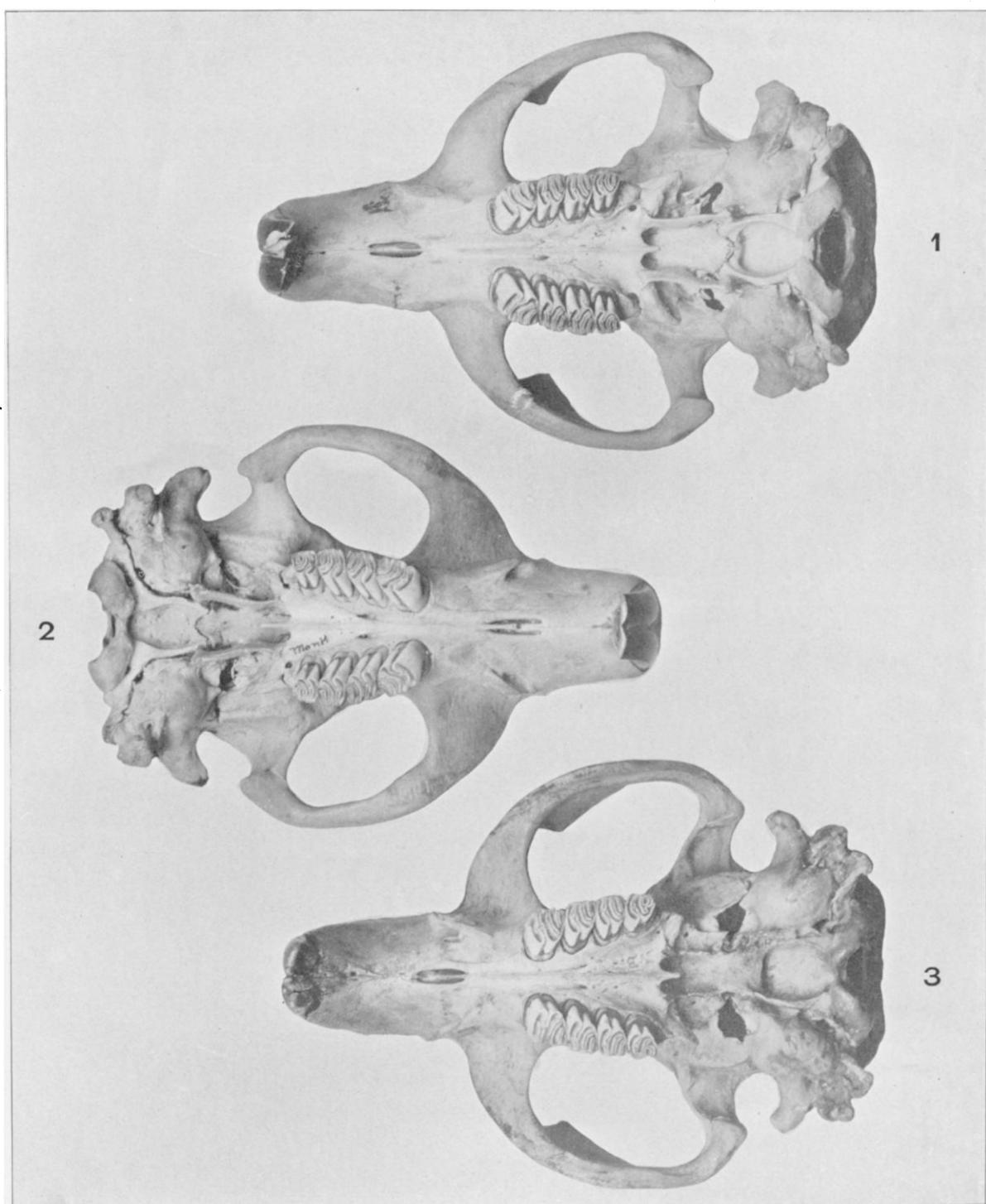
## Plate XXV.

(Scale slightly less than five-sixths natural size.)

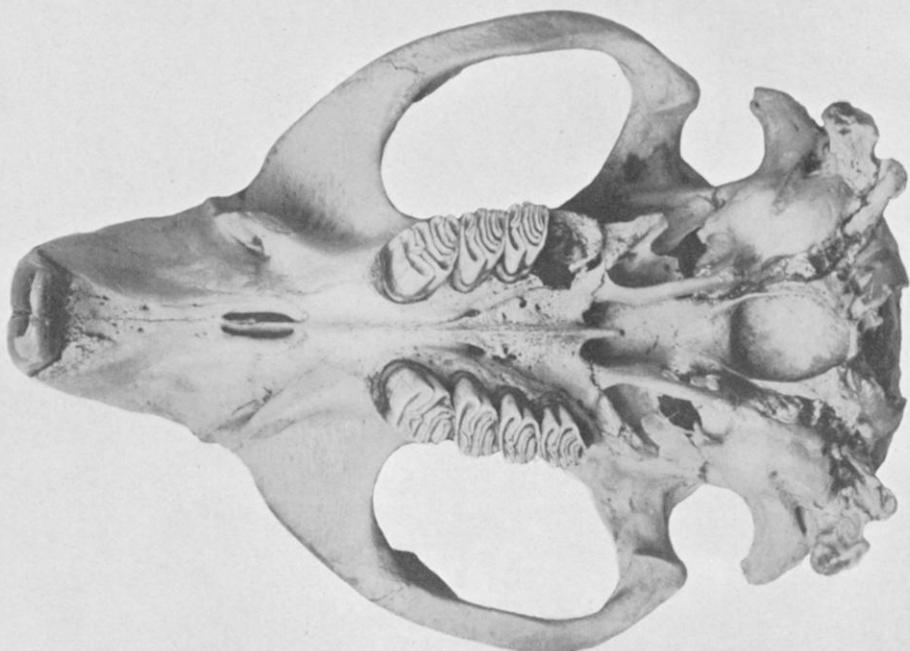
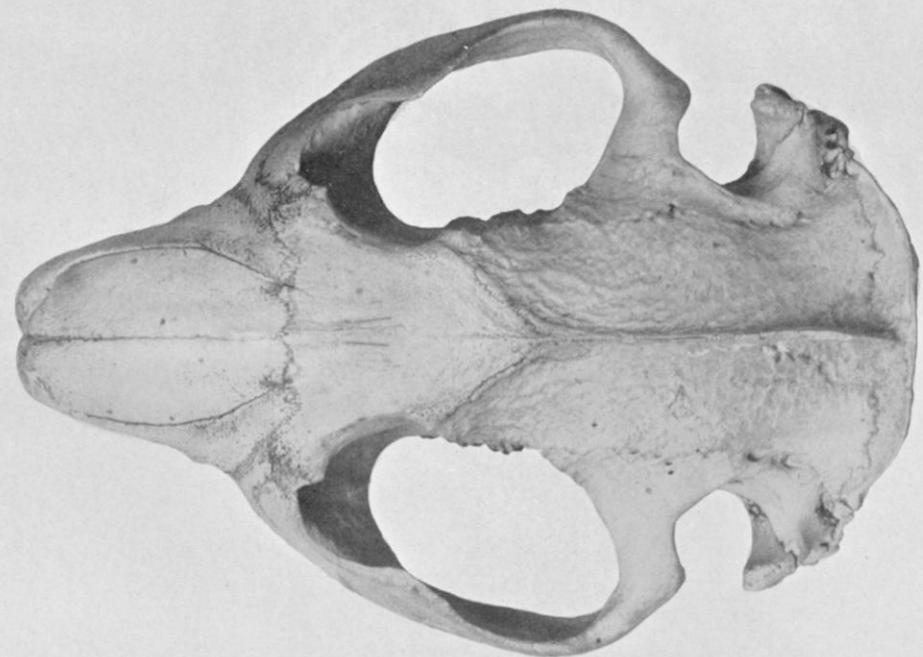
- Fig. 1. *Lutra hudsonica pacifica* Rhoads. No. 8687, col. of Smithsonian Institution; old adult (probably ♂), from (the coast of?) Alaska. Superior, vertical aspect of skull.
- Fig. 2. *Lutra hudsonica vaga* Bangs. No. 1580, col. of S. N. Rhoads; old adult ♂, from Tarpon Springs, Fla. Superior, vertical aspect of skull.
- Fig. 3. *Lutra hudsonica pacifica* Rhoads. No. 303, col. of S. N. Rhoads; old adult ♀, from Tacoma, Wash. Superior, vertical aspect of skull.



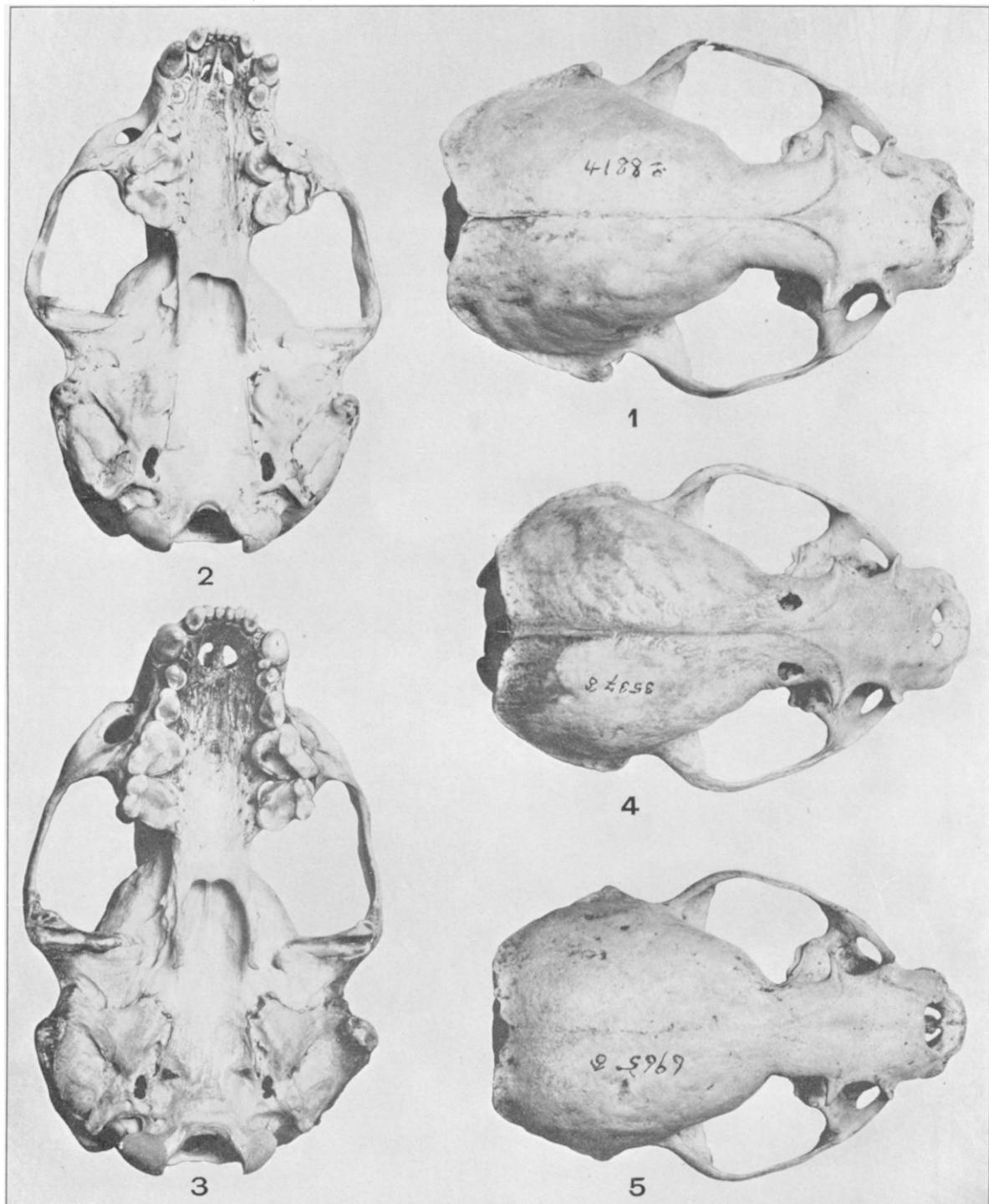
RHOADS—NORTH AMERICAN BEAVERS.



RHOADS—NORTH AMERICAN BEAVERS.



RHOADS—NORTH AMERICAN BEAVERS.



RHOADS—NORTH AMERICAN OTTERS.



RHOADS—NORTH AMERICAN OTTERS.